DETAILED ACTION

This action is in response to Request for Continued Examination and Amendment filed April 5, 2010 in which claims 43, 55, 57, 65, 78, 90 and 92 were amended as requested by applicant.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 43-51, 53-74, 76-86 and 88-99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer (US 2001/0040722) in view of Yonekubo (US 4,108,794) and Shafer (US 6,842,298).

Regarding claims 43, 46, 50-51, 53-55, 57, 59, 63, 65, 69, 73, 74, 76-78, 81, 85-86, 88-90, 92, 94 and 98, Shafer '722 teaches an objective (fig. 3) constructed of a single glass material (page 6, section [0082]) for use with light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range (page 6, section [0082]), comprising: at least one focusing lens (308) having diameter less than approximately 100 millimeters (fig. 3) receiving said light energy and transmitting focused light energy; at least one

field lens (304 or 307) having diameter less than approximately 100 millimeters (fig. 3), receiving said focused light energy and transmitting intermediate light energy; and at least one Mangin mirror element (306), which is an optical element, having diameter less than 100 millimeters (fig. 3) receiving said intermediate light energy and providing controlled light energy to a specimen (309, not shown); wherein each focusing lens and each field lens is formed from a single glass material and aligned substantially along an axis, and further wherein the Mangin mirror element, the at lest one focusing lens, and the at least one field lens are configured to balance aberrations therebetween, the aberration balancing reducing decenter sensitivity of the Mangin mirror element, the at lest one focusing lens and the at least one field lens (para. 0096), wherein the objective is optimized to produce minimum spherical aberration, axial color, and chromatic variation of aberrations (page 7, sections [0083]-[0085]); wherein the at least one Mangin mirror element is optimized to produce spherical, axial color, and chromatic variation of aberrations to compensate for aberrations induced by the focusing lens group (page 6, section [0081]); wherein each lens used in the objective has a diameter of less than approximately 25 millimeters (fig. 3); wherein said objective is configured to provide broadband imaging while receiving light energy at wavelengths less than 400 nm (see at least the abstract); and wherein said at least one Mangin mirror element (306) comprises a single lens/mirror element comprising substantially curved concave surface (top surface in figure); and a second minimally curved surface (bottom surface in figure). Shafer '722 states "the arrangement of Fig. 7 allow for improved design performance and relaxes manufacturing tolerances…decentering of any lens by 5 microns will cause less than one quarter wave of coma without any compensating elements." Examiner takes "the arrangement" to be the same as "configured" and Shafer '722 states "the

arrangement" is used to reduce the error caused by decentering. Shafer '722 lacks the controlled light energy going through an immersion substance to the specimen and wherein both surfaces of the single lens/mirror element are reflective with small central apertures through which light energy may pass. Yonekubo teaches using an immersion substance, including water and oil, to obtain better imaging performance (columns 1-2). Shafer '722 lacks reference to the Mangin mirror, field lens group and focusing lens group all being along a received light energy axis. Shafer '298 teaches a shift from an off-axis orientation similar to Shafer '722 to a system where all elements are on the same optical axis is beneficial to decrease manufacturing costs (col. 1 lines 55-65; Figs. 2-3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a well known immersion substance with the objective of Shafer '722 as taught by Yonekubo to provide better imaging performance because of reduced reflections due to the index matching provided by the immersion substance. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Shafer '722 invention include the on axis arrangement as taught by Shafer '298 for the purpose of decreasing manufacturing costs (Shafer '298 col. 1 lines 55-65).

Regarding claims 49, 61-62, 72, 84 and 96-97, Shafer '722 teaches in fig. 9 an objective for use with light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range with field and focusing lenses and a Mangin mirror element less than approximately 100 millimeters (fig. 9) wherein only two glass materials are used (see table 5) comprising fused silica and calcium fluoride (see table 5). Shafer '722 lacks the controlled light energy going through an immersion substance to the specimen and said Mangin mirror element receiving said intermediate light energy through a back/rear side thereof. Immersion

substances, including water and oil are well known in the microscope/lithography art to obtain better imaging performance. Yonekubo teaches using an immersion substance, including water and oil, to obtain better imaging performance (columns 1-2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a well known immersion substance with the objective of Shafer '722 as taught by Yonekubo to provide better imaging performance.

Regarding claims 58 and 93, Shafer '722 teaches said objective (fig. 3) having a numerical aperture of greater than approximately 1.0 at the specimen (page 7, section [0085]).

Regarding claims 44-45, 56, 66-68, 64, 79-80, 91 and 99, Shafer '722 in view of Yonekubo as set forth above disclose the claimed invention except for wherein said objective has a field size of approximately 0.15 mm and a numerical aperture of approximately 1.2. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make objective have a field size of approximately 0.15 mm and a numerical aperture of approximately 1.2, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. One would have been motivated to have the objective have a field size of approximately 0.15 mm and a numerical aperture of approximately 1.2 for the purpose of providing a larger field of view. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 47-48, 60, 70, 71, 82, 83 and 95, Shafer '722 in view of Yonekubo as set forth above further disclose said objective having a long working distance used with a microscope (Shafer '722, figs. 1 and 2) having a flange (at 102 or 202) but is silent as to the location of the flange being approximately 45 millimeters from the specimen during normal

operation or at least approximately 100 millimeters from the specimen during normal operation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the flange be approximately 45 millimeters from the specimen during normal operation or at least approximately 100 millimeters from the specimen during normal operation, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. One would have been motivated to have the flange be approximately 45 millimeters from the specimen during normal operation or at least approximately 100 millimeters from the specimen during normal operation for the purpose of having an appropriate working area for interacting with/changing the specimen. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 52, 75 and 87 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer '722 et al. in view of Yonekubo and Shafer '298as applied to claims 43, 66 and 78 above and further in view Deutsch et al., WO 01/57563 A2.

Shafer '722 in view of Yonekubo and Shafer '298as applied to claims 43 and 78 above disclose the claimed invention except for the immersion substance being a silicone gel. Deutsch teaches using a silicone gel as an immersion substance (page 2, lines 18-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the immersion substance of Shafer '722 in combination with Yonekubo and Shafer '298 be a silicone gel as suggested by Deutsch et al. to provide more controllable flow characteristics to the immersion substance

Response to Arguments

Applicant's arguments, see Amendment, filed April 5, 2010, with respect to the rejection(s) of claim(s) 43 under Shafer '722 and Yonekubo have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Shafer '298. Applicant amended the claim language to overcome the prior art. The Shafer '298 reference was added to teach the newly claimed limitations.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to /JOSHUA L. PRITCHETT/ whose telephone number is (571)272-2318. The examiner can normally be reached on Monday - Friday 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JOSHUA L PRITCHETT/
Primary Examiner
Art Unit 2872